PRE-SYNOPSIS FOR Ph. D

ENTITLED

MOLECULAR STUDY OF BACTERIAL THREATS ON FISH SPECIES IN THE FISH MARKET OF LATUR DISTRICT

SUBMITTED TO

SWAMI RAMANAND TEERTH MARTHWADA UNIVERSITY, NANDED

(UGC Recognized NAAC Re-accredited 'B^{++}' grade state university)

Registration to Ph. D. Degree
Subject: Zoology
Faculty of Science & Technology

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August 2023

INTRODUCTION

India is the third largest fish producing country and the second largest aquaculture fish producer in the world. India contributes about 7% to the global fish production. The country is also home to more than 10% of the global fish biodiversity and is one of the 17-mega biodiversity rich countries. Around 14 million peoples were actively engaged in fisheries and its allied activities. Andhra Pradesh is the largest fish producer in the country followed by West Bengal and Gujarat. The fresh water resources are very precious for the life on our planet because fish is a low fat high quality protein. The number of dams, reservoirs, tanks, etc. has significantly increased in last few years. The aquatic ecosystem is important and it has large number of economically important animals especially fish which is an important source of food Pawra et.al., (2014). Water is an environment in which other organisms live besides fish, including many species of saprophyte bacteria inhabiting sediments and plants, as well as phytoplankton and zooplankton. Some of them colonise the skin, gills, and digestive tract of fish, living there as commensals, supporting digestion and having a beneficial effect on the immune system of these animals. These microorganisms could also threaten fish health and therefore are referred to as conditionally pathogenic Agnieszka Pękala (2018). The causes of the diseases may be various factors; however, the most important among bacterial infections are those caused by motile Aeromonas: A. hydrophila, A. sobria, and A. caviae. Clinical symptoms observed during health disorders vary depending on the type of disease. In cases of motile aeromonas infections (MAI), skin ulceration and gill and fin lesions are most frequently noticed. The disease can also become a systemic infection, and then it is called motile aeromonas septicaemia (MAS). In the present investigation to analyse contemporary health status of the fresh water fishes in fish market of Latur District. This study will reveal that the adverse and beneficial effects of various microbes on fish and human health and also this fish will be better for consuming or not.

REVIEW OF LITERATURE

International Status

There are many researcher were studied international and national level. The pathogenic bacteria were observed on fish body and it was very much harmful to fishes and humans also some international and national references in this synopsis. Galaviz-Silva, Goméz-Anduro et al.,(2009) It is well accepted that microorganisms are commonly present on fish surfaces, such as skin and gills, as well as inside of the fish in areas such as the

digestive tract and internal organs, for example, the kidney, liver, and spleen. However, fish and fish products, especially raw or under-cooked products, have been involved in outbreaks associated with bacterial pathogens, biotoxins, histamine, viruses, and/or parasites.

Novotny, Dvorska, Lorencova, Beran, & Pavlik, (2004) observed that the fish have been identified as reservoirs of bacterial pathogens linked to human diseases including Mycobacterium spp., Streptococcus iniae, Photobacterium damselae, Vibrio alginolyticus, Vibrio vulnificus, Vibrio c parahaemolyticus, Vibrio cholerae, Erysipelothrix rhusiopathiae, pathogenic Escherichia coli, Aeromonas spp., Salmonella spp., Staphylococcus aureus, Listeria monocytogenes, Clostridium botulinum, Clostridium perfringens, Campylobacter jejuni, Delftia acidovorans, Edwardsiella tarda, Legionella pneumophila, and Plesiomonas shigelloides. In addition to human pathogens, bacteria are considered the primary cause of fish spoilage (Rippen & Skonberg, 2012). Certain spoilage bacteria can produce decarboxylase enzymes and convert free histidine to appreciable quantities of histamine, resulting in scombroid poisoning, another food safety concern (Colombo, Cattaneo, Confalonieri, & Bernardi, 2018). The degeneration of fish is accelerated by microorganism associated with aquatic environment as well as contaminated during post –harvest handling, when fish dies microorganisms on the surface as well as gut and gills begins to utilize the fish protein and food nutrient resulting in loss of nutritional value (Ames,1992). Microbial activities create undesirable changes like off-flavors, texture and appearance (Jhonstone et al., 1994).

National Status

Rathod et al., (2022) stated that the Fish and Fish Products (FFPs) contain a wide array of microorganisms from different environments. These microorganisms lead to the spoilage of FFPs and pose health risks to consumers. Fish surfaces contain the microbiota, including natural microorganisms of the waters, from which fish are harvested, as well as acquired cross contamination microbiota which includes microorganisms entering the food from fish's contact surfaces, the air, soil, water/ice used for washing/fish handlers, packaging material and the storage environment. P. Vanamala et al., (2022) observed that the recent progress in aquaculture production parallels the growing number of disease incidences that harm global aquaculture production, profitability, and sustainability. Bacteria-related diseases can cause severe mortality in both wild and cultured fish. Bacterial diseases and the infections associated with them are widespread and are one of the most challenging health

problems to resolve effectively. Nair et al., (2023) revealed that the pathogens in fish generate alterations in physiology of fish with consequences in life function decreasing and death.

Regional Status and Scope of Study

This kind of research work does not focus in the Latur Districts on fish pathology by using 16S rRNA methods.

OBJECTIVE OF RESEARCH

- To study the microbial diversity of the fish market
- To study the microbial fauna of the fish skin and gut
- To study the pathogenic and non-pathogenic bacteria
- To study the bacterial effect of fishes and fisherman
- To study molecular techniques for identification of bacteria

MATERIAL AND METHODS

In the present study, Samples of fresh and disease fish will collect from fish market of the Latur Districts during the study. The collected fish subjected to gross clinical examination according to the method described by (Amlacher 1970), showed the clinical signs of Loss of scales from some areas of the skin, excessive mucus all over the body surfaces with haemorrhages over the dorsal musculature. Large necrotic lesions extending all over the body with tail rot. Skin showed superficial ulcers, and darkness of skin. The fish were separately transferred aseptically to laboratory without delay in large sterile jars containing water.

The surface of fish bodies will disinfect by 70% alcohol, and then dissect under antiseptic conditions. The freshly dead collected samples of fishes were subjected to post dissection before the bacteriological examination according to (Lucky 1977, and Conroy and Herman 1981).The post mortem examination reveal of generalized septicemia and enlargement in most internal organs especially kidney, liver, intestinal tract, spleen and severe distension of gall bladder with bile secretion, congested gills and gall bladder.

Specimens of fish obtain from skin, muscle; intestine and liver were inoculated directly in nutrient broth and incubated. Loopful from each broth culture were inoculated directly onto nutrient agar and various agar medium. The plates will incubate at 37ºC for 24-

48 hours. Suspected colonies onto the surface of these media were identified by studying characters of the colonies and molecular level by using 16S rRNA methods. All the sample further will use for microbial diversity and phylogenetic relationship, Elham I. Atwa (2017).

SCOPE OF THE STUDY

- This research work useful for antimicrobial drug design for fish health
- This study will determine the infection of fish food
- This study will reveal that the pathogenic fish bacteria will harmful to fish and human beings
- This research will provide plenty of knowledge for maintain hygienic conditions in the fish markets
- This study will develop awareness for fisherman and peoples

YEAR WISE PLAN OF WORK AND TARGETS TO BE ACHIEVED

First Year

- Collection of Review and Literature.
- Visit to Fish Markets and Preparation for next monthly visit plan.
- Collection of Microbial fauna from fish markets.
- Collection of Microbial diversity on various organs of fish.

Second Year

- Isolation and culture of microbes in Fish market.
- Isolation and culture of microbes outside and inside organs of fishes.
- Identification of microbes by using molecular techniques.

Third Year

- Study the microbial Phylogenetic Relationship
- Thesis writing, typing and Binding
- Final Synopsis Submission
- Pre-Ph. D. Viva and Thesis submission

PROPOSED WORK PLAN -TENTATIVE CHAPTER SCHEME

- **Chapter I-** Introduction
- **Chapter II-** Review of Literature
- **Chapter III-** Materials and Methods
- **Chapter IV-** Results and Discussion
- **Chapter V-** Conclusion
- **Chapter VI-** Recommendations
- **Chapter VII-** References

FUTURE PERSPECTIVES:

- Drug design for fishes
- Antimicrobial test for fishes

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